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ABSTRACT

An overview of literature on research dealing with adult learning and the physical environment discusses three elements of the research: (1) the reductionistic approaches; (2) the notable exceptions; and (3) the functional environment. Conclusions are made regarding the future direction of research involving adult learning and the physical environment. Includes 18 references. (SI)

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AN OVERVIEW OF THE RESEARCH ON PHYSICAL LEARNING ENVIRONMENTS

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A review of the literature on adult learning and the physical environment reveals that while certain concepts are well researched others remain relatively unexplored. Although many researchers take as a given that the design of the learning environment does impact on the quality of the learning activity, there are some shortcomings in the research literature. Often, one reads opinions and feelings that may not be substantiated by rigorous research methodology. None-the-less, Dunn and Dunn (1979) categorically stated:

> Based on observations, interviews and experimental studies conducted since 1967, it has become apparent that regardless of their age, ability, socioeconomic status, or achievement level, individuals respond uniquely to their immediate environment. (p.239)

Fitt (1974) stated the same concept concluding from her qualitative studies that, "Any spatial transaction between an individual and his environment depends on two variables: the individuals's idiosyncratic use of space and the environment's structuring" (p.617).

Most of the research reported was conducted in the traditional learning environment--the classroom. Since the majority of the inhabitants of classrooms were students in elementary and secondary schools, most of the research has been conducted in this "laboratory". Some research with college students has been reported but generally still in the classroom. Expanding one's review into psychology and sociology, there are good sources of information, but the research tends to be with samples of atypical populations, generally institutionalized clients, so one must be careful in generalizing from these studies. The fields of architecture and design can contribute to knowledge of physical learning environments; however, Robert Sommer (1980), a psychologist at The University of California,Davis, who has written extensively on this subject, warned:

> The intense period of architecture's flirtation with the behavioral sciences has passed. I do not consider this a cause for regret...Our two fields can still come together as circumstances permit. Although the passion in our association has dissipated, what remains, I hope, are respect, friendship and mutual assistance. (p.82)

It is from a perspective of mutual assistance not passion that we must look to architectural research for help!

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Reductionistic Approaches

Most of the experimental research on physical design factors reduced the environment to a single factor to be studied. The goal often was to find the ideal state for the environment. The reasons for this are understandable; the rigors of experimental design required identifiable variables to be studied, that measurement be more exact and that extraneous or confounding variables be controlled. This reduction of the environment to its most basic factors contributed the bulk of experimental research. Zifferblatt (1972) hypothesized that:

> It is possible that the physical design, or architecture, of an environment may also be functionally related to behavior; i.e., the physical design settings might control how people behave in them. (p.54)

This position reduced the study of the physical environment effects to behavioristic inquiry into "the physical design...stimulus cues that hopefully influence behavior." (p.54). Zifferblatt reported only anecdotal and correlational data but concluded that "architecture facilitates or impedes educational outcomes, depending upon its use by the teacher." (p.57).

Perhaps the most widely researched environmental question was that of seating arrangement. Becker, Sommer, Bee, and Oxley (1973) reported that student participation in class is a function of seating arrangement but further caution, "that simply altering the physical structure, without an accompanying change in the social structure, will not produce real change." (p.523). Koneya (1976) found that row and column location in seating contributes to the ability to verbalize in a classroom postulating "that seating arrangements which restrict the choices available to an individual may cause psychological stress which, in turn, could unfavorably influence verbal behavior." (p. 280). Sommer (1967) reported research that supports the "expressive contact hypothesis...relating direct visual contact to increased interaction." (p.489). Using a sample of introductory psychology class students, he found that no matter what the arrangement of the room (seminar vs. classroom) students seated so as to maximize eye contact with the professor participated more than other students. However, Stires (1980) raised the question as to whether classroom participation and grades being effected by seating arrangement was a matter of environment or self-selection. Stires questioned that since the participants in Becker et al. were "free to choose their own seats suggests self-selection as an alternative explanation." (p.242). Using criteria other than just participation to measure learning, Stires used test scores as an independent variable. Using ANOVA for main effect, Stires reported that since there was no significant interaction, "these results support the environmental hypothesis rather than the self-selection hypothesis." (p.247).

Two studies have investigated the effects of windows or the lack thereof. In 1965, Karmel used high school students "to assess the psychological effect, if any, of a windowless classroom environment" (p.277). Psychologists rated drawings and suggested "more unhappy or maladjusted children (were) attending the windowless school."(p.278). Since there was very little control over possible extraneous variables, the author cautions,"whether the maladjustment was related to the lack of windows in the school building is beyond the scope of this paper" (p.278).

Mandel, Baron, and Fisher (1980) investigated "the effects of certain aspects of the outdoor environment on the spatial perceptions of the occupants of residential settings" (p.308) and found that "the window probably had more to do with visual escape and distraction from the properties of the room" (p.309).

Notable exceptions

Two important depatures from the traditions of classrooms and students are found in the work of Sommer (1970) and Vosko (1984 & 1985). In researching study areas as opposed to the classroom, Sommer (1970) asserted:

> It is important to realize that studying takes place in many settings, each offering unique characteristics to a studier. The approach of the present investigation is naturalistic in that it is focused upon behavior as it occurs in the field. We want to learn the varieties of places used for studying and the perceived advantages and disadvantages of each location. (p.271)

Examining libraries, residences, cafeterias, lounges, classrooms, laboratories, and outdoor areas, Sommer (1970) sought "the students' reasons for studying in each location..."(p.274). Then he concluded:

> Putting together the results of our interviews and observations, it becomes clear that it is an illusion to thing (sic) in terms of an "ideal study environment". No single study situation...can satisfy the needs of introverts and extroverts, lone and group studiers...What is needed is a variety of study situations that can appeal to students with particular interests. (p.277)

Vosko studied proxemics to determine the effects of both seating arrangement and distance zones. His work is relevant in that he looked outside the traditional institution of the school to study adults in a continuing education program. One of his most interesting findings was that even when adults saw a need for change in their immediate physical environments, they seldom, if ever, initiated any such change. Both the learners and the teachers stated that they perceived the responsibility for changes in physical environment to be that of administrators.

The functional environment

All the studies discussed so far have reduced the environment to some single factor or set of factors, have quantified those, and have drawn conclusions based on this reductionistic approach. There is; however, an alternate way to conceptualize the physical environment. David (1979) labeled this approach the functional environment stating:

> A barrier to the effective assessment of classroom physical settings has been the tendency of evaluators to define the environment purely in terms of discrete structural features (e.g. lighting, temperature, color) which appear to offer little promise as meaningful instructional variables. A more productive approach would be to investigate what might be called "functional" properties of physical settings--areas where physical features and social/curricular concerns intersect. (p.160A)

Weinstein (1981) has called for "teachers and instructional designers...to develop...'environmental competence'--the awareness of the physical environment and its impact and the ability to use or change that environment to suit one's needs"(p.17). She further states four basic assumptions about the physical setting supported by her interpretation of others research and her own research:

> The first premise states that the physical setting of the classroom is an integral element of the learning environment. Although it does not "teach", the classroom setting facilitates certain behaviors and hinders others. The second premise is that studies of classroom environment must take into account the social and instructional context...what David (1979) has called the functional environment...the third assumption is that there is no ideal physical setting that will satisfy all learning situations...the last premise...the physical setting of a classroom constitutes an external condition that must be arranged as systematically as the other elements of the stimulus situation. (pp.12-13)

Early research had also emphasized the importance of the perception of the environment by the learner. Kasmar (1970) exhorted: "If people are indeed sensitive to and do respond to the perceptual cues of architectural environments, then it behooves us to elicit their impressions..." (p.154). He then conducted research to develop a lexicon of paired descriptive adjectives to describe physical environments using samples of undergraduate students and adults ranging in age from 23 to 70. As a result of Kasmar's work an Environment Description Scale or EDS was published. Moos (1973) took Kasmar's work a step further and developed a conceptual framework for human environments since "Behavior necessarily occurs in a specific physical context, which may impose major constraints on the range of possible behaviors..."(p.652) His typology offered six "categories of dimensions" (p.652) that were "nonexclusive, overlapping, and mutually interrelated." (p.652).

Conclusions

This overview of the literature shows that although a good amount of basic research and conceptualization has been done over the past thirty years, there is still more that needs to be done. Many of the studies need to be replicated on larger samples and on population samples not yet researched, most notably adults. The definition of learning environment must be broadened beyond the traditional classroom and the definition of learner must be broadened beyond student. Finally, there must be investigation of how the effects of individual physical attributes such as light, temperature, and seating arrangement interact together to influence the environment's function. The separate attributes looked at in quantitative research must be viewed holistically with perhaps a qualitative analysis to determine the effect of the total physical environment as it actually exists in real life learning situations. For many years now adult educators have been told that the physical environment does influence behavior. White (1972) boldly stated that "general estimates indicate that while about seventy-five per cent of learning is accounted for by motivation, meaningfulness, and memory, the remaining twenty-five per cent of learning is dependent upon the effects of the physical environment" (p.1). What we need to do is to understand more of how and why it does.

Bibliography

Becker, F., Sommer, R., Bee, J.,& Oxley, B. (1973). College classroom ecology. Sociometry, 36 (4), 514-525.

David, T. (1979). Students' and teachers' reactions to classroom environment (Doctoral dissertation, University of Chicago,1979). Dissertation Abstracts International, 40, 160A-161A.

Dunn, R. & Dunn, K. (1979). Learning styles/teaching styles: should they...can they...be matched?. Educational Leadership, 36 (4), 238-244.

Fitt, S. (1974). The individual and his environment. School Review, 82 (4), 617-620.

Karmel, L. (1965). Effects of windowless classroom environment on high school students. Perceptual and Motor Skills, 20, 277-278.

Kasmar, J. (1970). The development of a usable lexicon of environmental descriptors. Environment and Behavior, 2 (2),153-169.

Koneya, M. (1976). Location and interaction in row and column seating arrangements. Environment and Behavior, 8 (2), 265-282.

Mandel, D., Baron, R., & Fisher, J. (1980). Room utilization and dimensions of density. Environment and Behavior, 12 (3), 308-319.

Moos, R. (1973). Conceptualizations of human environments. American Psychologist, 28 (8), 652-665.

Sommer, R. (1967). Classroom ecology. Journal of Applied Behavioral Science, 3 (4), 489-503.

Sommer, R. (1970). The ecology of study areas. Environment and Behavior, 2 (3), 271-280.

Sommer, R. (1980). Architecture, psychology: the passion has passed. AIA Journal, 69 (4), 76 & 82.

Stires, L. (1980). Classroom seating, location, student grades and attitudes: environment or self-selection?. Environment and Behavior, 12 (2), 241-254.

Vosko, R. (1984). Shaping spaces for lifelong learning. Lifelong Learning, 9 (1), 4-7 & 28.

Vosko, R. (1985). The reactions of adult learners to selected instructional environments. Dissertation Abstracts International, 45, 3519A. (University Microfilms Order No. DA 8500772)

Weinstein, C. (1981). Classroom design as an external condition for learning. Educational Technology, 21 (8), 12-19.

White, S. (1972). Physical criteria for adult learning environments. Washington, D.C.: Adult Education Association of the U.S.A., Commission on Planning Adult Learning Systems,Facilities, and Environments. (ERIC Document Reproduction Service No. ED 080 882)

Zifferblatt, S. (1972). Architecture and human behavior: toward increased understanding of a functional relationship. Educational Technology, 12 (8), 54-57.